

【Table 11】

No.	alloy composition (wt%)								metal construction	
	Cu	Si	Pb	Al	P	Mn	Ni	Zn	phases	$\gamma + \kappa + \mu$ (%)
7021	75.0	4.2	0.19	1.7			2.1	remainder	$\alpha + \beta + \gamma + \kappa$	60
7021a										
7022	72.3	3.7	0.05	1.4		1.1	0.8	remainder	$\alpha + \beta + \gamma$	50
7022a										
7023	64.5	3.8	0.35	0.3		2.0	2.3	remainder	$\alpha + \beta + \gamma$	10
7023a										
7024	75.8	3.9	0.05	2.7	0.04	1.0		remainder	$\alpha + \beta + \gamma + \kappa$	45
7024a										
7025	70.1	3.5	0.06	1.2	0.23		3.0	remainder	$\alpha + \beta + \gamma$	30
7025a										
7026	67.2	2.8	0.22	1.8	0.14	2.2	0.9	remainder	$\alpha + \beta + \gamma$	15
7026a										
7027	70.2	3.8	0.11		0.03	3.2		remainder	$\alpha + \beta + \gamma$	25
7027a										
7028	75.9	4.4	0.03		0.20		1.1	remainder	$\alpha + \beta + \gamma + \kappa$	65
7028a										
7029	66.0	3.0	0.18		0.12	1.0	2.1	remainder	$\alpha + \beta + \gamma$	10
7029a										

【Table 12】

No.	alloy composition (wt%)							metal construction	
	Cu	Si	Pb	Al	P		Zn	phases	$\gamma + \kappa + \mu$ (%)
8001	74.5	2.9	0.16	0.2	0.05		remainder	$\alpha + \gamma + \kappa$	25
8002	76.0	2.7	0.03	1.2	0.21		remainder	$\alpha + \gamma + \kappa$	30
8003	76.3	3.0	0.35	0.6	0.12		remainder	$\alpha + \gamma + \kappa + \mu$	40
8004	69.9	2.1	0.27	0.3	0.03		remainder	$\alpha + \beta + \gamma$	10
8005	71.5	2.3	0.12	0.8	0.10		remainder	$\alpha + \beta + \gamma$	15
8006	78.1	3.6	0.05	0.2	0.13		remainder	$\alpha + \kappa$	55
8007	77.7	3.4	0.18	1.4	0.06		remainder	$\alpha + \gamma + \kappa$	65
8008	77.5	3.5	0.03	0.9	0.15		remainder	$\alpha + \gamma + \kappa + \mu$	60

【Table 13】

No.	alloy composition (wt%)									metal construction	
	Cu	Si	Pb	Al	P	Bi	Te	Se	Zn	phases	$\gamma + \kappa + \mu$ (%)
9001	74.8	2.8	0.05	0.6	0.07	0.03			remainder	$\alpha + \gamma + \kappa$	30
9002	76.6	2.9	0.12	0.9	0.03	0.32			remainder	$\alpha + \gamma + \kappa$	40
9003	72.3	2.2	0.32	0.5	0.12		0.25		remainder	$\alpha + \beta + \gamma$	20
9004	77.2	3.0	0.07	1.4	0.21		0.05		remainder	$\alpha + \gamma + \kappa + \mu$	45
9005	78.1	3.6	0.16	0.3	0.15			0.29	remainder	$\alpha + \kappa + \mu$	60
9006	74.5	2.6	0.05	0.6	0.08			0.07	remainder	$\alpha + \gamma + \kappa$	25

Table 14

No.	alloy composition (wt%)								metal construction	
	Cu	Si	Pb	Al	P	Cr	Ti	Zn	phases	$\gamma + \kappa + \mu$ (%)
10001	76.0	2.8	0.12	0.7	0.13		0.21	remainder	$\alpha + \gamma + \kappa + \mu$	30
10002	75.0	3.0	0.03	0.2	0.05		0.03	remainder	$\alpha + \gamma + \kappa$	35
10003	78.3	3.4	0.06	1.3	0.20		0.34	remainder	$\alpha + \kappa + \mu$	55
10004	69.6	2.1	0.25	0.8	0.03		0.17	remainder	$\alpha + \beta + \gamma$	25
10005	77.5	3.6	0.12	0.7	0.15	0.23		remainder	$\alpha + \gamma + \kappa$	60
10006	71.8	2.2	0.32	1.2	0.08	0.32		remainder	$\alpha + \beta + \gamma$	30
10007	74.7	2.7	0.10	0.6	0.10	0.03		remainder	$\alpha + \gamma + \kappa$	30
10008	75.4	2.9	0.03	0.3	0.06	0.12	0.08	remainder	$\alpha + \gamma + \kappa + \mu$	35

Table 15

No.	alloy composition (wt%)											metal construction	
	Cu	Si	Pb	Al	Bi	Te	Se	P	Cr	Ti	Zn	phases	$\gamma + \kappa + \mu$ (%)
11001	76.5	2.9	0.08	0.9	0.03			0.12	0.03		remainder	$\alpha + \gamma + \kappa$	40
11002	70.4	2.2	0.32	0.5	0.21			0.03	0.18		remainder	$\alpha + \beta + \gamma$	25
11003	78.2	3.5	0.16	1.3	0.35			0.20		0.34	remainder	$\alpha + \kappa + \mu$	65
11004	73.9	2.7	0.03	0.3	0.11			0.06		0.22	remainder	$\alpha + \gamma$	30
11005	75.8	3.0	0.06	0.6	0.08			0.11	0.10	0.07	remainder	$\alpha + \gamma + \kappa$	40
11006	71.6	2.1	0.24	1.0		0.21		0.04	0.32		remainder	$\alpha + \beta + \gamma$	30
11007	73.8	2.4	0.10	1.1		0.04		0.07		0.03	remainder	$\alpha + \gamma$	30
11008	75.5	3.0	0.13	0.2		0.36		0.12	0.06	0.14	remainder	$\alpha + \gamma + \kappa$	35
11009	77.7	3.2	0.03	1.4			0.17	0.23	0.23		remainder	$\alpha + \gamma + \kappa$	50
11010	75.0	2.7	0.15	0.7			0.03	0.03		0.12	remainder	$\alpha + \gamma + \kappa$	35
11011	72.9	2.4	0.20	0.8			0.31	0.06	0.09	0.05	remainder	$\alpha + \gamma$	30

【Table 16】

No.	alloy composition (wt%)				heat treatment		metal construction	
	Cu	Si	Pb	Zn	temperature	time	phases	$\gamma + \kappa + \mu$ (%)
12001	69.3	2.3	0.05	remainder	580°C	30min.	$\alpha + \gamma + \kappa$	20
12002	69.3	2.3	0.05	remainder	450°C	2hr.	$\alpha + \gamma + \kappa + \mu$	20
12003	78.5	2.9	0.05	remainder	580°C	30min.	$\alpha + \gamma + \kappa$	35
12004	78.5	2.9	0.05	remainder	450°C	2hr.	$\alpha + \gamma + \kappa + \mu$	35

【Table 17】

No.	alloy composition (wt%)								metal construction	
	Cu	Si	Pb	Sn	Al	Mn	Ni	Fe	Zn	phases
13001	58.8		3.1	0.2				0.2	remainder	$\alpha + \beta$
13001a										
13002	61.4		3.0	0.2				0.2	remainder	$\alpha + \beta$
13002a										
13003	59.1		2.0	0.2				0.2	remainder	$\alpha + \beta$
13003a										
13004	69.2	1.2	0.1						remainder	$\alpha + \beta$
13004a										
13005	remainder				9.8	1.1	1.2	3.9		$\alpha + \beta$
13005a										
13006	61.8		0.1	1.0					remainder	$\alpha + \beta + \gamma$
13006a										